FINAL INTERIM SOURCE CONTROL WORK PLAN SLUDGE ISOLATION

November 29, 1989

ENVIROCON, INC.

FINAL INTERIM SOURCE CONTROL WORK PLAN SLUDGE ISOLATION

Submitted to:

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SERVICES

Cogswell Building

Helena, Montana 59807

Submitted by:

BURLINGTON NORTHERN RAILROAD

9401 Indian Creek Parkway

Overland Park, Kansas 66201

Prepared by:

ENVIROCON, INC.

101 International Way

Missoula, Montana 59807

Submittal Date:

November 29, 1989

1.0 INTRODUCTION

During the course of the remedial investigations conducted in Livingston, a number of potential source contamination areas including the four sludge pits have been identified. As part of the Interim Remedial Measures Work Plan (IRMWP, Envirocon, 1989), interim remedial source controls were planned for these sludge pits during the construction season of 1989. Because of unexpected delay brought on by the public comment period and the decision to renegotiate the Partial Consent Decree, Envirocon, representing Burlington Northern Railroad (BNRR) has been unable to initiate field work. However, it is still possible to implement source control/removal measures in the sludge pits this year which limit the potential for continued contaminant migration.

The primary objective of the proposed sludge pit source control operations will be to remove liquids and sludge materials which may be contributing to contamination of the shallow alluvial aquifer. The unlined condition of the pond does not prohibit continued infiltration of liquids especially from water originating as precipitation or snowmelt. Groundwater investigations conducted throughout the summer and fall indicate the sludge pits to be a likely contributor to the overall groundwater contamination associated with the rail yard. The first step in reduction of the potential for further spreading of the contaminant plume will be source control. This work plan outlines the proposed source control measures for the sludge pits.

2.0 SLUDGE CHARACTERIZATION

The sludges in the four pits were sampled and analyzed by ReTec in September 1987 (reference ReTec report entitled Waste Characterization Results, Livingston, Montana Fueling Facility, November 1987) and by Envirocon, Inc. in July 1989 (Appendix A). The samples were evaluated for the following analytes:

ReTec samples:

·Volatile Organics	EPA method 624;
·Semivolatile Organics	EPA method 625;
·Pesticides and PCBs	EPA method 608; and
·RCRA Characteristics	

Envirocon samples:

·Volatile Organics	EPA Method 624;
·Semivolatile Organics	EPA Method 625; and
·Pesticides and PCBs	EPA Method 608.

The results of the analyses are summarized on Table 1. Results from the sampling rounds indicate the materials in the sludge pits do not meet the RCRA characteristics as a hazardous waste from corrosivity, reactivity, ignitability, and EP toxicity. Data derived from sampling using approved quality assurance/quality control (QA/QC) protocols does not indicate the presence of tetrachloroethene (PCE) or trichloroethene (TCE) in the sludges with the exception of the cinder pile lagoon, where low levels (fractional parts per million) of TCE were detected. No PCBs or pesticides were detected. ReTec's data was collected pursuant to Montana Department of Health and Environmental Sciences (MDHES) approved QA/QC protocols. Envirocon's data was collected pursuant to the QA/QC protocols outlined in the IRMWP.

During biologic treatability studies conducted by TreaTek, Inc. on the potential for biological treatment of the sludges, invalidated data was generated indicating the presence of additional chlorinated compounds in the waste water treatment plant (WWTP) sump and cinder pile lagoon. These results were not generated following an approved QA/QC program.

Envirocon recognizes that in the past MDHES has taken the position that the presence of chlorinated solvents in sludges may cause them to be hazardous wastes. BNRR does not agree with this position. Envirocon proposes to carry out the following work plan on all sludges, subject to MDHES's direction with respect to the WWTP sump and cinder pile lagoon.

3.0 SOURCE CONTROL

The proposed source control operation will involve removal and treatment of the free liquids, sludge stabilization, sludge isolation, and run-on and run-off controls. The source control operations will be conducted according to all appropriate procedures outlined in the IRMWP (Envirocon, 1989).

A representative schematic of the sludge pits in their current condition is shown on Figure 1. The volume of sludge in the API separator pond and the overflow pond is estimated to be 400 cu yds. In addition, the two sludge pits contain approximately 400 gallons of free liquids.

Work zones will be established around each work area according to Section 11.0 of the IRMWP. Air monitoring will be conducted on both the personnel and down wind of the work area during sludge isolation operations. Air monitoring will be conducted according to Section 9.7 of the amended IRMWP using carbon traps and low flow air pumps. All personnel will wear the appropriate level of personal protection as outlined in Section 11.0 of the IRMWP. Personnel will follow decontamination procedures outlined in Section 11.0.

All equipment and supplies will be decontaminated according to Section 9.0 of the IRMWP. A portable metal decontamination rack will be used to collect rinsate water during decontamination procedures. The rinsate will be collected and stored with the free liquids removed from the sludge pits.

3.1 Liquids Removal and Treatment

Removal of the liquids will be performed using a portable vacuum tank. The vacuum unit will be DOT certified for flammable materials. The vacuum unit will be stationed immediately adjacent to the sludge pit within the work zone. Free liquids will be removed from the sludge pits under negative pressure through a suction hose. The vacuum unit is equipped with an automatic overflow shutoff to avoid releases from overfilling.

The liquids will be transported by the vacuum unit to a rail tank car staged near the WWTP. The liquids will be transloaded from the vacuum unit to the tank car using positive pressure. Appropriate precautions will be taken to avoid releases. Free liquids from the sludge pits will be removed and placed in the railcar until no further free liquids can be removed from the sludge pits. Perforated sumps will be installed below the free liquid surface within the sludge pits to enhance free liquids removal.

Following removal of all the free liquids, the tank car contents will be characterized for disposal/treatment. The free oils will be allowed to gravity separate from the water. The water and free oils will be sampled and characterized separately. A spill control plan will be developed for the stored water and oils and will be submitted to the MDHES for review.

The water within the tank car will be characterized to determine if treatment through the on site WWTP is appropriate. Sludge waters which can be treated to effluent standards under either the MPDES or public owned treatment works (POTW) permits will be treated and discharged accordingly. Effluent characterization frequencies will be increased beyond the standard effluent characterization requirements. Effluent will be characterized daily during all treatment operations to document compliance with effluent standards.

The sludge waters will be pumped from the tank car using the existing pump and piping system. The water will be removed in a passive manner to avoid mixing with the free oils. The water will be treated through the standard operations of the WWTP. The oils will be removed from the tank car following removal of the water.

The free oils will be characterized to evaluate appropriate disposal or recycling options. Oils meeting the specifications for energy recovery (40 CFR 266.40) will be shipped to a licensed oil recycling center in Portland, Oregon.

3.2 Solidification

Sludge solidification will involve adding a water sorbent or water reactive agent to render a semisolid sludge for materials handling purposes. Envirocon is currently researching a number of solidification agents including hydrated lime, kiln dust, fly ash, polymers, organics, and diatomaceous earth. The long-term remediation alternatives, such as thermal and biological treatments, are being considered during the selection process. A second option would involve the physical dewatering of the sludges such as a belt press prior to adding the solidification agent.

The solidification agent will be mixed with the sludge within the sludge pits using the tracked backhoe and tracked bulldozer. The sludge will be solidified until the material meets the standard for free liquids using the "paint filter test."

3.3 Sludge Isolation

Sludge isolation will involve movement of the solidified sludge from the flow of the ponds onto a liner and capping the sludge with a cover to control runon and runoff. Following sludge isolation, the remaining area of the sludge pits will be covered with a liner to minimize infiltration of precipitation through the soils and gravels. The following isolation plan will be used for the sludge pits with a slight modification to the lower elevation of the API overflow pond floor. Prior to the sludge isolation activities, each pond will be fenced to limit access.

The sludge isolation will be conducted using the tracked backhoe and tracked bulldozer which conducted the solidification. Sludge isolation will be conducted immediately following the solidification at each sludge pit. This will minimize equipment decontamination procedures.

Following sludge solidification, the sludge will be consolidated at one end of each pit. The solidified sludge and contaminated soils will be removed down to a depth where native soils/gravels are encountered. The cleared area will be prepared for the liner installation. The area will be graded level and compacted with all sharp objects and cobbles removed. A berm will be constructed of native materials in each sludge pit as shown on Figure 2.0. The berm will be of sufficient height to allow containment of the sludge at or below the top of the berm.

The liner material used will consist of 30-mil very low density polyethylene (VLDPE) made by Poly America Inc. The bottom liner will be welded on site to provide a single liner within each sludge pit. The liner material will be placed in the prepared area following all manufacturer's recommendations. The liner will be sized to extend up the sides of the bermed area to provide sufficient space below the lined area. The liner will be secured using anchor trenches as shown on Figure 2.0.

Following placement of the liner, the solidified sludge will be transferred into the lined area using the tracked backhoe. The tracked backhoe will work from the benched area adjacent to the berm. The tracked bulldozer will feed the tracked backhoe. The solidified sludges will be removed down to the native soils.

The original pit, including the sludge containment area, will be covered using 30-mil VLDPE to minimize infiltration from precipitation. The cover liner will be custom manufactured as one piece for each sludge pit as shown on Figure 2.0. The cover will be secured using perimeter anchor trenches. Precipitation will be removed from the cover and disposed of using a construction dewatering discharge permit.

Sludge isolation of the overflow pond will involve a modification to the above standard plan. Because this sludge pit bottom is in contact with the water table during the spring, the sludge containment area will be to the northeast of the sludge pit as shown on Figure 3.0. A berm will be constructed around the containment area using native soils. The containment area and liner construction will be similar to the above detailed operation. The sludge containment area will be covered with a synthetic liner as detailed above. Because the overflow pond is in connection with the water table, a cover will not be used in the overflow pond.

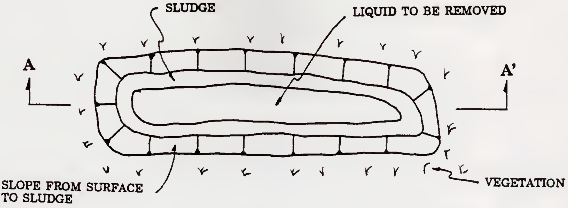
4.0 SCHEDULE

Envirocon will begin mobilization of equipment and personnel within 24 hours of approval from the MDHES. Envirocon will begin liquid removal operations within seven days of authorization. Envirocon anticipates four weeks to complete the activities outlined above contingent on weather conditions.

TABLE 1
Summary of Sludge Characterization

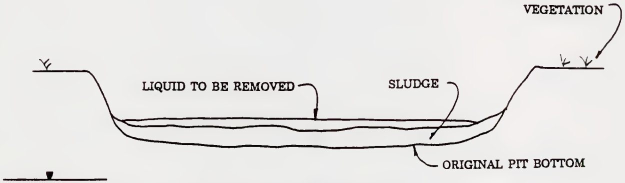
Analytes	Wastewater Treatment Plant Sump		Cinder Pile Lagoon		Separator Pond		Overflow Pond	
	June, 1989	Sept., 1987*	June, 1989	Sept., 1987*	June, 1989	Sept., 1987*	June, 1989	Sept, 1987*
Volatile Organics:	**ppb**	**ppm**	**ppb**	**ppm**	**ppb**	**ppm**	**ppb**	**ppm**
1,1,2-Trichloroethane	42	N.A.	<5	N.A.	<5	N.A.	<2.5	N.A.
1,2,4-Trimethylbenzene	21	N.A.	<5	N.A.	8.5	N.A.	<2.5	N.A.
1,3,5-Trimethylbenzene	<10	N.A.	<5	N.A.	11	N.A.	<2.5	N.A.
2-Chlorotoluene	172	N.A.	6	N.A.	135	N.A.	<2.5	N.A.
Chlorobenzene	<10	<0.85	<5	5.5	<5	22.3	3.9	<0.85
1,2-Dichloroethene	188	65	129	430	<5	6	<2.5	<0.85
Ethylbenzene	<10	1.6	<5	<0.85	<5	1	<2.5	<0.85
m + p-xylene	14	9.5	<5	<0.85	<5	13	<2.5	<0.85
Napthalene	21	9	<5	<33.3	<5	<33.3	<2.5	<33.3
Trichloroethene	<5	<0.85	<2.5	3.8	<2.5	<.85	<1.25	<0.85
Semi-Volatile Organics:	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Phenanthrene	253	220	1.8	57	<125	80	<10	160
Flourene	<30	170	<1	<33.3	<125	54	<10	70
2-Methylnapthalene	N.A.	2000	N.A.	220	N.A.	550	N.A.	210
Flouranthene	<30	44	<1	<33.3	<125	<33.3	<10	34
Dibenzofuran	<30	110	N.A.	<33.3	N.A.	<33.3	N.A.	<33.3

Notes:
* Analysis Performed By ReTec
N.D. - Not Detected
N.A. - Not Analyzed



PLAN VIEW (EXISTING)

NOT TO SCALE

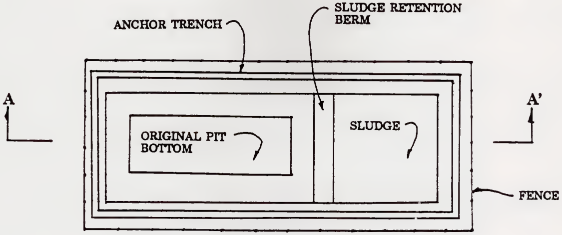


APPROXIMATE GROUNDWATER LEVEL

SECTION A-A' (EXISTING)

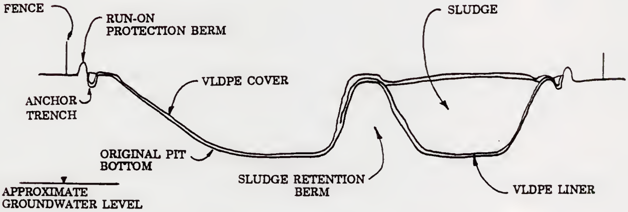
NOT TO SCALE

PROJECT No.		
14-0101	ENVIROCON	EXISTING CONDITIONS SLUDGE PITS
DATE 10/89		
REVISION 0		FIGURE 1



PLAN VIEW (FINAL)

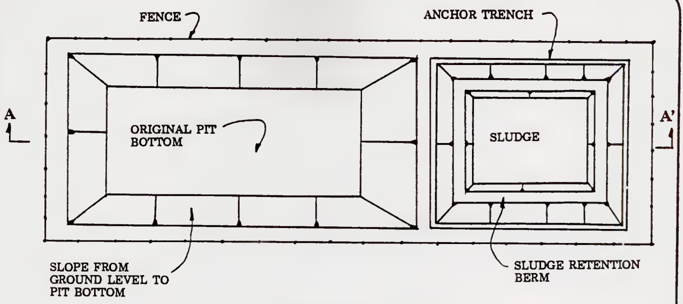
NOT TO SCALE



SECTION A-A' (FINAL)

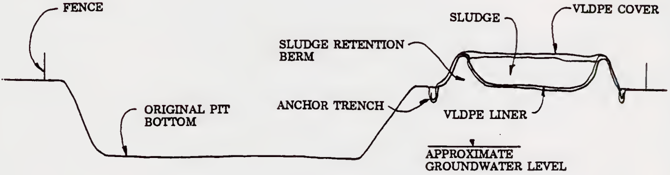
NOT TO SCALE

PROJECT No. 14-0101	ENVIROCON	FINAL CONDITIONS SLUDGE PITS
DATE 10/89		
REVISION 0		FIGURE 2



PLAN VIEW (FINAL)

NOT TO SCALE



SECTION A-A' (FINAL)

NOT TO SCALE

PROJECT No. 14-0101	ENVIROCON	FINAL CONDITIONS OVERFLOW POND
DATE 10/89		
REVISION 0		FIGURE 3

APPENDIX A

ENVIROCON, INC.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
800-673-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9774
DATE: 07/27/89 dya

SLUDGE ANALYSIS

Livingston/BN
140101-029
Sampled 06/19/89 @ 1345
Submitted 06/21/89

EPA METHOD 625: Wastewater Treatment Plant Sump

Acid Extractables

	mg/l		mg/l
4-Chloro-3-methylphenol	<10	2-Nitrophenol	<10
2-Chlorophenol	<10	4-Nitrophenol	<50
2,4-Dichlorophenol	<10	Pentachlorophenol	<50
2,4-Dimethylphenol	<10	Phenol	<10
2,4-Dinitrophenol	<50	2,4,6-Trichlorophenol	<10
2-Methyl-4,6-dinitrophenol	<50		

Base Neutral Extractables

Acenaphthene	<30	3,3-Dichlorobenzidine	<30
Acenaphthylene	<30	Diethyl phthalate	<30
Anthracene	<30	Dimethyl phthalate	<30
Azobenzene	<30	Di-n-butyl phthalate	<30
Benzidine	<30	2,4-Dinitrotoluene	<30
Benzo(a)anthracene	<30	2,6-Dinitrotoluene	<30
Benzo(a)pyrene	<30	Di-n-octyl phthalate	<30
Benzo(b)fluoranthene	<30	Fluoranthene	<30
Benzo(k)fluoranthene	<30	Fluorene	<30
Benzo(ghi)perylene	<30	Hexachlorobenzene	<30
Bis(2-chloroethoxy)methane	<30	Hexachlorobutadiene	<30
Bis(2-chloroethyl)ether	<30	Hexachloroethane	<30
Bis(2-chloroisopropyl)ether	<30	Indeno (1,2,3-cd)pyrene	<30
Bis(2-ethylhexyl)phthalate	<30	Isophorone	<30
4-Bromophenylphenyl ether	<30	Naphthalene	<30
Butyl benzyl phthalate	<30	Nitrobenzene	<30
2-Chloronaphthalene	<30	N-Nitrosophenylamine	<30
4-Chlorophenylphenyl ether	<30	N-Nitrosodi-n-propylamine	<30
Chrysene	<30	Phenanthrene	253
Dibenzo(a,h)anthracene	<30	Pyrene	<30
1,2-Dichlorobenzene	<30	1,2,4-Trichlorobenzene	<30
1,3-Dichlorobenzene	<30		
1,4-Dichlorobenzene	<30		

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DATE: 07/27/89 dya

SLUDGE ANALYSIS

Livingston/BN
140101-029
Sampled 06/19/89 @ 1345
Submitted 06/21/89

Wastewater Treatment Plant Sump

Pesticides and PCB's (EPA Method 608):

CONSTITUENT	µg/l
Aldrin	<5.0
alpha BHC	<5.0
beta BHC	<5.0
delta BHC	<5.0
gamma BHC	<5.0
Chlordane	<10.0
4,4'-DDD	<10.0
4,4'-DDE	<5.0
4,4'-DDT	<10.0
Dieldrin	<5.0
Endosulfan I	<10.0
Endosulfan II	<5.0
Endosulfan sulfate	<10.0
Endrin	<5.0
Endrin aldehyde	<10.0
Heptachlor	<5.0
Heptachlor epoxide	<10.0
Toxaphene	<100.0
PCB-1016	<100.0
PCB-1221	<100.0
PCB-1232	<100.0
PCB-1242	<100.0
PCB-1248	<100.0
PCB-1254	<100.0
PCB-1260	<100.0

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LAB NO.: 89-9774
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SLUDGE ANALYSIS
Livingston/BN
140101-029
Sampled 06/19/89 @ 1345
Submitted 06/21/89

Wastewater Treatment Plant Sump

Volatile Organic Constituent	µg/l	Volatile Organic Constituent	µg/l
Dichlorodifluoromethane	<10.0	1,1,1,2-Tetrachloroethane	<10.0
Chloromethane	<10.0	Ethylbenzene	<10.0
Vinyl chloride	<5.0	m+p-Xylene	14
Bromomethane	<10.0	o-Xylene	<10.0
Chloroethane	<10.0	Styrene	<10.0
Trichlorofluoromethane	<10.0	Bromoform	<10.0
1,1-Dichloroethene	<5.0	Isopropylbenzene	<10.0
Methylene Chloride	<10.0	1,1,2,2-Tetrachloroethane	<10.0
trans-1,2-Dichloroethene	<10.0	Bromobenzene	<10.0
1,1-Dichloroethane	<10.0	1,2,3-Trichloropropane	<10.0
2,2-Dichloropropane	<10.0	n-Proylbenzene	<10.0
cis-1,2-Dichloroethene	188	2-Chlorotoluene	172
Chloroform	<10.0	1,3,5-Trimethylbenzene	<10.0
Bromochloromethane	<10.0	4-Chlorotoluene	<10.0
1,1,1-Trichloroethane	<5.0	tert-Butylbenzene	<10.0
Carbon Tetrachloride	<5.0	1,2,4-Trimethylbenzene	21
1,1-Dichloropropene	<10.0	sec-Butylbenzene	<10.0
Benzene	<5.0	p-Isopropyltoluene	<10.0
1,2-Dichloroethane	<5.0	1,3-Dichlorobenzene	<10.0
Trichloroethene	<5.0	1,4-Dochlorobenzene	<5.0
1,2-Dichloropropane	<10.0	n-Butylbenzene	<10.0
Bromodichloromethane	<10.0	1,2-Dichlorobenzene	<10.0
Dibromomethane	<10.0	1,2-Dibromo-3-Chloropropane	<10.0
Toluene	<10.0	1,2,4-Trichlorobenzene	<10.0
1,1,2-Trichloroethane	42	Hexachlorobutadiene	<10.0
Tetrachloroethene	<10.0	Naphthalene	21
1,3-Dichloropropane	<10.0	1,2,3-Trichlorobenzene	<10.0
Dibromochloromethane	<10.0	cis-1,3-Dichloropropene	<10.0
1,2-Dibromoethane	<10.0	trans-1,3-Dichloropropene	<10.0
Chlorobenzene	<10.0		

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2

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LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9775
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-030
Sampled 06/19/89 @ 1430
Submitted 06/21/89

Cinder Pile Lagoon

EPA METHOD 625:

Acid Extractables

	mg/l		mg/l
4-Chloro-3-methylphenol	<1.0	2-Nitrophenol	<1.0
2-Chlorophenol	<1.0	4-Nitrophenol	<5.0
2,4-Dichlorophenol	<1.0	Pentachlorophenol	<5.0
2,4-Dimethylphenol	<1.0	Phenol	<1.0
2,4-Dinitrophenol	<5.0	2,4,6-Trichlorophenol	<1.0
2-Methyl-4,6-dinitrophenol	<5.0		

Base Neutral Extractables

Acenaphthene	<1.0	3,3-Dichlorobenzidine	<1.0
Acenaphthylene	<1.0	Diethyl phthalate	<1.0
Anthracene	<1.0	Dimethyl phthalate	<1.0
Azobenzene	<1.0	Di-n-butyl phthalate	<1.0
Benzidine	<1.0	2,4-Dinitrotoluene	<1.0
Benzo(a)anthracene	<1.0	2,6-Dinitrotoluene	<1.0
Benzo(a)pyrene	<1.0	Di-n-octyl phthalate	<1.0
Benzo(b)fluoranthene	<1.0	Fluoranthene	<1.0
Benzo(k)fluoranthene	<1.0	Fluorene	<1.0
Benzo(ghi)perylene	<1.0	Hexachlorobenzene	<1.0
Bis(2-chloroethoxy)methane	<1.0	Hexachlorobutadiene	<1.0
Bis(2-chloroethyl)ether	<1.0	Hexachloroethane	<1.0
Bis(2-chloroisopropyl)ether	<1.0	Indeno (1,2,3-cd)pyrene	<1.0
Bis(2-ethylhexyl)phthalate	<1.0	Isophorone	<1.0
4-Bromophenylphenyl ether	<1.0	Naphthalene	<1.0
Butyl benzyl phthalate	<1.0	Nitrobenzene	<1.0
2-Chloronaphthalene	<1.0	N-Nitrosophenylamine	<1.0
4-Chlorophenylphenyl ether	<1.0	N-Nitrosodi-n-propylamine	<1.0
Chrysene	<1.0	Phenanthrene	1.8
Dibenzo(a,h)anthracene	<1.0	Pyrene	<1.0
1,2-Dichlorobenzene	<1.0	1,2,4-Trichlorobenzene	<1.0
1,3-Dichlorobenzene	<1.0		
1,4-Dichlorobenzene	<1.0		

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LABORATORY REPORT

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DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-030
Sampled 06/19/89 @ 1430
Submitted 06/21/89

Cinder Pile Lagoon

Pesticides and PCB's (EPA Method 608):

CONSTITUENT	µg/l
Aldrin	<0.50
alpha BHC	<0.50
beta BHC	<0.50
delta BHC	<0.50
gamma BHC	<0.50
Chlordane	<1.0
4,4'-DDD	<1.0
4,4'-DDE	<0.50
4,4'-DDT	<1.0
Dieldrin	<0.50
Endosulfan I	<1.0
Endosulfan II	<0.50
Endosulfan sulfate	<1.0
Endrin	<0.50
Endrin aldehyde	<1.0
Heptachlor	<0.50
Heptachlor epoxide	<1.0
Toxaphene	<10.0
PCB-1016	<10.0
PCB-1221	<10.0
PCB-1232	<10.0
PCB-1242	<10.0
PCB-1248	<10.0
PCB-1254	<10.0
PCB-1260	<10.0

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800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9775
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-030
Sampled 06/19/89 @ 1430
Submitted 06/21/89

Cinder Pile Lagoon

Volatile Organic Constituent	µg/l	Volatile Organic Constituent	µg/l
Dichlorodifluoromethane	<5.0	1,1,1,2-Tetrachloroethane	<5.0
Chloromethane	<5.0	Ethylbenzene	<5.0
Vinyl chloride	<2.50	p-Xylene	<5.0
Bromomethane	<5.0	m-Xylene	<5.0
Chloroethane	<5.0	o-Xylene	<5.0
Trichlorofluoromethane	<5.0	Styrene	<5.0
1,1-Dichloroethene	<2.50	Bromoform	<5.0
Methylene Chloride	<5.0	Isopropylbenzene	<5.0
trans-1,2-Dichloroethene	<5.0	1,1,2,2-Tetrachloroethane	<5.0
1,1-Dichloroethane	<5.0	Bromobenzene	<5.0
2,2-Dichloropropane	<5.0	1,2,3-Trichloropropane	<5.0
cis-1,2-Dichloroethene	129	n-Propylbenzene	<5.0
Chloroform	<5.0	2-Chlorotoluene	6.0
Bromochloromethane	<5.0	1,3,5-Trimethylbenzene	<5.0
1,1,1-Trichloroethane	<2.50	4-Chlorotoluene	<5.0
Carbon Tetrachloride	<2.50	tert-Butylbenzene	<5.0
1,1-Dichloropropene	<5.0	1,2,4-Trimethylbenzene	<5.0
Benzene	<2.50	sec-Butylbenzene	<5.0
1,2-Dichloroethane	<2.50	p-Isopropyltoluene	<5.0
Trichloroethene	<2.50	1,3-Dichlorobenzene	<5.0
1,2-Dichloropropane	<5.0	1,4-Dichlorobenzene	<2.50
Bromodichloromethane	<5.0	n-Butylbenzene	<5.0
Dibromomethane	<5.0	1,2-Dichlorobenzene	<5.0
Toluene	<5.0	1,2-Dibromo-3-Chloropropane	<5.0
1,1,2-Trichloroethane	<5.0	1,2,4-Trichlorobenzene	<5.0
Tetrachloroethene	<2.50	Hexachlorobutadiene	<5.0
1,3-Dichloropropane	<5.0	Naphthalene	<5.0
Dibromochloromethane	<5.0	1,2,3-Trichlorobenzene	<5.0
1,2-Dibromoethane	<5.0	cis-1,3-Dichloropropene	<5.0
Chlorobenzene	<5.0	trans-1,3-Dichloropropene	<5.0

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2

ENERGY LABORATORIES

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P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
800-673-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9773
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-028
Sampled 06/19/89 @ 1245
Submitted 06/21/89

EPA METHOD 625: Overflow Pond

Acid Extractables

	µg/l		µg/l
4-Chloro-3-methylphenol	<10	2-Nitrophenol	<10
2-Chlorophenol	<10	4-Nitrophenol	<50
2,4-Dichlorophenol	<10	Pentachlorophenol	<50
2,4-Dimethylphenol	<10	Phenol	<10
2,4-Dinitrophenol	<50	2,4,6-Trichlorophenol	<10
2-Methyl-4,6-dinitrophenol	<50		

Base Neutral Extractables

Acenaphthene	<10	3,3-Dichlorobenzidine	<10
Acenaphthylene	<10	Diethyl phthalate	<10
Anthracene	<10	Dimethyl phthalate	<10
Azobenzene	<10	Di-n-butyl phthalate	<10
Benzidine	<10	2,4-Dinitrotoluene	<10
Benzo(a)anthracene	<10	2,6-Dinitrotoluene	<10
Benzo(a)pyrene	<10	Di-n-octyl phthalate	<10
Benzo(b)fluoranthene	<10	Fluoranthene	<10
Benzo(k)fluoranthene	<10	Fluorene	<10
Benzo(ghi)perylene	<10	Hexachlorobenzene	<10
Bis(2-chloroethoxy)methane	<10	Hexachlorobutadiene	<10
Bis(2-chloroethyl)ether	<10	Hexachloroethane	<10
Bis(2-chloroisopropyl)ether	<10	Indeno (1,2,3-cd)pyrene	<10
Bis(2-ethylhexyl)phthalate	<10	Isophorone	<10
4-Bromophenylphenyl ether	<10	Naphthalene	<10
Butyl benzyl phthalate	<10	Nitrobenzene	<10
2-Chloronaphthalene	<10	N-Nitrosophenylamine	<10
4-Chlorophenylphenyl ether	<10	N-Nitrosodi-n-propylamine	<10
Chrysene	<10	Phenanthrene	<10
Dibenzo(a,h)anthracene	<10	Pyrene	<10
1,2-Dichlorobenzene	<10	1,2,4-Trichlorobenzene	<10
1,3-Dichlorobenzene	<10		
1,4-Dichlorobenzene	<10		

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800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9773
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-028
Sampled 06/19/89 @ 1245
Submitted 06/21/89

Overflow Pond

Pesticides and PCB's (EPA Method 608):

CONSTITUENT	μg/l
Aldrin	<0.05
alpha BHC	<0.05
beta BHC	<0.05
delta BHC	<0.05
gamma BHC	<0.05
Chlordane	<0.10
4,4'-DDD	<0.10
4,4'-DDE	<0.05
4,4'-DDT	<0.10
Dieldrin	<0.05
Endosulfan I	<0.10
Endosulfan II	<0.05
Endosulfan sulfate	<0.10
Endrin	<0.05
Endrin aldehyde	<0.10
Heptachlor	<0.05
Heptachlor epoxide	<0.10
Toxaphene	<1.0
PCB-1016	<1.0
PCB-1221	<1.0
PCB-1232	<1.0
PCB-1242	<1.0
PCB-1248	<1.0
PCB-1254	<1.0
PCB-1260	<1.0

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LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9773
DATE: 07/27/89 dya

WATER ANALYSIS
Livingston/BN
140101-028
Sampled 06/19/89 @ 1245
Submitted 06/21/89

Overflow Pond

Volatile Organic Constituent	µg/l	Volatile Organic Constituent	µg/l
Dichlorodifluoromethane	<2.50	1,1,1,2-Tetrachloroethane	<2.50
Chloromethane	<2.50	Ethylbenzene	<2.50
Vinyl chloride	<1.25	p-Xylene	<2.50
Bromomethane	<2.50	m-Xylene	<2.50
Chloroethane	<2.50	o-Xylene	<2.50
Trichlorofluoromethane	<2.50	Styrene	<2.50
1,1-Dichloroethene	<1.25	Bromoform	<2.50
Methylene Chloride	<2.50	Isopropylbenzene	<2.50
trans-1,2-Dichloroethene	<2.50	1,1,2,2-Tetrachloroethane	<2.50
1,1-Dichloroethane	<2.50	Bromobenzene	<2.50
2,2-Dichloropropane	<2.50	1,2,3-Trichloropropane	<2.50
cis-1,2-Dichloroethene	<2.50	n-Propylbenzene	<2.50
Chloroform	<2.50	2-Chlorotoluene	<2.50
Bromochloromethane	<2.50	1,3,5-Trimethylbenzene	<2.50
1,1,1-Trichloroethane	<1.25	4-Chlorotoluene	<2.50
Carbon Tetrachloride	<1.25	tert-Butylbenzene	<2.50
1,1-Dichloropropene	<2.50	1,2,4-Trimethylbenzene	<2.50
Benzene	<1.25	sec-Butylbenzene	<2.50
1,2-Dichloroethane	<1.25	p-Isopropyltoluene	<2.50
Trichloroethene	<1.25	1,3-Dichlorobenzene	<2.50
1,2-Dichloropropane	<2.50	1,4-Dichlorobenzene	<1.25
Bromodichloromethane	<2.50	n-Butylbenzene	<2.50
Dibromomethane	<2.50	1,2-Dichlorobenzene	<2.50
Toluene	<2.50	1,2-Dibromo-3-Chloropropane	<2.50
1,1,2-Trichloroethane	<2.50	1,2,4-Trichlorobenzene	<2.50
Tetrachloroethene	<1.25	Hexachlorobutadiene	<2.50
1,3-Dichloropropane	<2.50	Naphthalene	<2.50
Dibromochloromethane	<2.50	1,2,3-Trichlorobenzene	<2.50
1,2-Dibromoethane	<2.50	cis-1,3-Dichloropropene	<2.50
Chlorobenzene	3.9	trans-1,3-Dichloropropene	<2.50

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2

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800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-027
Sampled 06/19/89 @ 1200
Submitted 06/21/89

EPA METHOD 625: Separator Pond

Acid Extractables

	µg/l		µg/l
4-Chloro-3-methylphenol	<25	2-Nitrophenol	<25
2-Chlorophenol	<25	4-Nitrophenol	<125
2,4-Dichlorophenol	<25	Pentachlorophenol	<125
2,4-Dimethylphenol	<25	Phenol	<25
2,4-Dinitrophenol	<125	2,4,6-Trichlorophenol	<25
2-Methyl-4,6-dinitrophenol	<125		

Base Neutral Extractables

Acenaphthene	<125	3,3-Dichlorobenzidine	<125
Acenaphthylene	<125	Diethyl phthalate	<125
Anthracene	<125	Dimethyl phthalate	<125
Azobenzene	<125	Di-n-butyl phthalate	<125
Benzidine	<125	2,4-Dinitrotoluene	<125
Benzo(a)anthracene	<125	2,6-Dinitrotoluene	<125
Benzo(a)pyrene	<125	Di-n-octyl phthalate	<125
Benzo(b)fluoranthene	<125	Fluoranthene	<125
Benzo(k)fluoranthene	<125	Fluorene	<125
Benzo(ghi)perylene	<125	Hexachlorobenzene	<125
Bis(2-chloroethoxy)methane	<125	Hexachlorobutadiene	<125
Bis(2-chloroethyl)ether	<125	Hexachloroethane	<125
Bis(2-chloroisopropyl)ether	<125	Indeno (1,2,3-cd)pyrene	<125
Bis(2-ethylhexyl)phthalate	<125	Isophorone	<125
4-Bromophenylphenyl ether	<125	Naphthalene	<125
Butyl benzyl phthalate	<125	Nitrobenzene	<125
2-Chloronaphthalene	<125	N-Nitrosophenylamine	<125
4-Chlorophenylphenyl ether	<125	N-Nitrosodi-n-propylamine	<125
Chrysene	<125	Phenanthrene	<125
Dibenzo(a,h)anthracene	<125	Pyrene	<125
1,2-Dichlorobenzene	<125	1,2,4-Trichlorobenzene	<125
1,3-Dichlorobenzene	<125		
1,4-Dichlorobenzene	<125		

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800-673-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772
DATE: 07/27/89 dya

WATER ANALYSIS
Livingston/BN
140101-027
Sampled 06/19/89 @ 1200
Submitted 06/21/89

Separator Pond

Pesticides and PCB's (EPA Method 608):

CONSTITUENT	µg/l
Aldrin	<0.50
alpha BHC	<0.50
beta BHC	<0.50
delta BHC	<0.50
gamma BHC	<0.50
Chlordane	<1.0
4,4'-DDD	<1.0
4,4'-DDE	<0.50
4,4'-DDT	<1.0
Dieldrin	<0.50
Endosulfan I	<1.0
Endosulfan II	<0.50
Endosulfan sulfate	<1.0
Endrin	<0.50
Endrin aldehyde	<1.0
Heptachlor	<0.50
Heptachlor epoxide	<1.0
Toxaphene	<10.0
PCB-1016	<10.0
PCB-1221	<10.0
PCB-1232	<10.0
PCB-1242	<10.0
PCB-1248	<10.0
PCB-1254	<10.0
PCB-1260	<10.0

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LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772
DATE: 07/27/89 dya

WATER ANALYSIS

Livingston/BN
140101-027
Sampled 06/19/89 @ 1200
Submitted 06/21/89

Separator Pond

Volatile Organic Constituent	µg/l	Volatile Organic Constituent	µg/l
Dichlorodifluoromethane	<5.0	1,1,1,2-Tetrachloroethane	<5.0
Chloromethane	<5.0	Ethylbenzene	<5.0
Vinyl chloride	<2.50	p-Xylene	<5.0
Bromomethane	<5.0	m-Xylene	<5.0
Chloroethane	<5.0	o-Xylene	<5.0
Trichlorofluoromethane	<5.0	Styrene	<5.0
1,1-Dichloroethene	<2.50	Bromoform	<5.0
Methylene Chloride	<5.0	Isopropylbenzene	<5.0
trans-1,2-Dichloroethene	<5.0	1,1,2,2-Tetrachloroethane	<5.0
1,1-Dichloroethane	<5.0	Bromobenzene	<5.0
2,2-Dichloropropane	<5.0	1,2,3-Trichloropropane	<5.0
cis-1,2-Dichloroethene	<5.0	n-Propylbenzene	<5.0
Chloroform	<5.0	2-Chlorotoluene	135
Bromochloromethane	<5.0	1,3,5-Trimethylbenzene	11
1,1,1-Trichloroethane	<2.50	4-Chlorotoluene	<5.0
Carbon Tetrachloride	<2.50	tert-Butylbenzene	<5.0
1,1-Dichloropropene	<5.0	1,2,4-Trimethylbenzene	8.5
Benzene	<2.50	sec-Butylbenzene	<5.0
1,2-Dichloroethane	<2.50	p-Isopropyltoluene	<5.0
Trichloroethene	<2.50	1,3-Dichlorobenzene	<5.0
1,2-Dichloropropane	<5.0	1,4-Dichlorobenzene	<2.50
Bromodichloromethane	<5.0	n-Butylbenzene	<5.0
Dibromomethane	<5.0	1,2-Dichlorobenzene	<5.0
Toluene	<5.0	1,2-Dibromo-3-Chloropropane	<5.0
1,1,2-Trichloroethane	<5.0	1,2,4-Trichlorobenzene	<5.0
Tetrachloroethene	<2.50	Hexachlorobutadiene	<5.0
1,3-Dichloropropane	<5.0	Naphthalene	<5.0
Dibromochloromethane	<5.0	1,2,3-Trichlorobenzene	<5.0
1,2-Dibromoethane	<5.0	cis-1,3-Dichloropropene	<5.0
Chlorobenzene	<5.0	trans-1,3-Dichloropropene	<5.0

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2

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ENERGY LABORATORIES, INC.

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800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772 -75
DATE: 07/27/89 dya

WATER ANALYSIS
Livingston/BN
Trip Blank
Submitted 06/21/89

Volatile Organic Constituent	µg/l	Volatile Organic Constituent	µg/l
Dichlorodifluoromethane	<1.0	1,1,1,2-Tetrachloroethane	<1.0
Chloromethane	<1.0	Ethylbenzene	<1.0
Vinyl chloride	<0.50	p-Xylene	<1.0
Bromomethane	<1.0	m-Xylene	<1.0
Chloroethane	<1.0	o-Xylene	<1.0
Trichlorofluoromethane	<1.0	Styrene	<1.0
1,1-Dichloroethene	<0.50	Bromoform	<1.0
Methylene Chloride	<1.0	Isopropylbenzene	<1.0
trans-1,2-Dichloroethene	<1.0	1,1,2,2-Tetrachloroethane	<1.0
1,1-Dichloroethane	<1.0	Bromobenzene	<1.0
2,2-Dichloropropane	<1.0	1,2,3-Trichloropropane	<1.0
cis-1,2-Dichloroethene	<1.0	n-Propylbenzene	<1.0
Chloroform	<1.0	2-Chlorotoluene	<1.0
Bromochloromethane	<1.0	1,3,5-Trimethylbenzene	<1.0
1,1,1-Trichloroethane	<0.50	4-Chlorotoluene	<1.0
Carbon Tetrachloride	<0.50	tert-Butylbenzene	<1.0
1,1-Dichloropropene	<1.0	1,2,4-Trimethylbenzene	<1.0
Benzene	<0.50	sec-Butylbenzene	<1.0
1,2-Dichloroethane	<0.50	p-Isopropyltoluene	<1.0
Trichloroethene	<0.50	1,3-Dichlorobenzene	<1.0
1,2-Dichloropropane	<1.0	1,4-Dichlorobenzene	<0.50
Bromodichloromethane	<1.0	n-Butylbenzene	<1.0
Dibromomethane	<1.0	1,2-Dichlorobenzene	<1.0
Toluene	<1.0	1,2-Dibromo-3-Chloropropane	<1.0
1,1,2-Trichloroethane	<1.0	1,2,4-Trichlorobenzene	<1.0
Tetrachloroethene	<0.50	Hexachlorobutadiene	<1.0
1,3-Dichloropropane	<1.0	Naphthalene	<1.0
Dibromochloromethane	<1.0	1,2,3-Trichlorobenzene	<1.0
1,2-Dibromoethane	<1.0	cis-1,3-Dichloropropene	<1.0
Chlorobenzene	<1.0	trans-1,3-Dichloropropene	<1.0

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2

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ENERGY LABORATORIES, INC.

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LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772 -75
DATE: 07/27/89 dya

EPA WATER POLLUTION QUALITY CONTROL SAMPLES

GC/MS BASE NEUTRALS -I

This EPA reference sample was analyzed with your samples lab no.'s 89-9772 -75 with the following results:

PARAMETER	ug/l Test Value	ug/l True Value	P (%)	Range for P, Ps (%)
Bis (2-chloroethyl) ether	68	100	68	12 - 158
1,3-Dichlorobenzene	154	100	154	D - 172
1,2-Dichlorobenzene	106	100	106	32 - 129
Nitrosodi-n-propylamine	40	100	40	D - 230
Isophorone	40	100	40	21 - 196
Bis (2-Chloroethoxy)methane	55	100	55	33 - 184
1,2,4-Trichlorobenzene	72	100	72	44 - 142
Hexachlorobutadiene	54	100	54	24 - 116
2-Chloronaphthalene	82	100	82	60 - 118
2,6-Dinitrotoluene	117	100	117	50 - 158
2,4-Dinitrotoluene	99	100	99	39 - 139
Diethyl Phthalate	76	100	76	D - 114
Hexachlorobenzene	82	100	82	D - 152
Phenanthrene	66	100	66	54 - 120
Di-n-butyl Phthalate	46	100	46	1 - 118
Pyrene	71	100	71	53 - 115
Benzo (a) anthracene	103	100	103	33 - 143
Di-n-octyl Phthalate	90	100	90	4 - 146
Benzo (k) fluoranthene	108	100	108	11 - 162

P,Ps = Percent recovery measured.

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P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772 -75
DATE: 07/27/89 dya

EPA WATER POLLUTION QUALITY CONTROL SAMPLE

This EPA reference sample was analyzed with your lab no.s 89-9972 -75
with the following results:

PARAMETER	µg/l Test Value	µg/l True Value	P (%)	Range for P (%)
Heptachlor	2.28	2.0	114	42 - 122
Aldrin	1.72	2.0	86	34 - 111
DDE	1.38	2.0	69	30 - 145
Dieldrin	1.69	2.0	85	36 - 146
DDD	11.14	10.0	111	31 - 141
DDT	6.12	10.0	61	25 - 160

P = Percent recovery measured.

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ENERGY LABORATORIES, INC.

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800-873-5227

LABORATORY REPORT

TO: Envirocon
ADDRESS: P.O. Box 8243
Missoula, MT 59807

LAB NO.: 89-9772 -75
DATE: 07/27/89 dya

EPA WATER SUPPLY QUALITY CONTROL SAMPLE

Volatile Organic Contaminants

This EPA reference sample was analyzed with your lab no.s 89-9972 -75
with the following results:

PARAMETER	Test Value (µg/l)	True Value (µg/l)	P (%)	Range for P (%)
Benzene	4.8	5.0	96	60 - 140
Ethylbenzene	5.0	5.0	100	60 - 140
m-Xylene	3.9	5.0	78	60 - 140
n-Propylbenzene	4.8	5.0	96	60 - 140
4-Chlorotoluene	4.6	5.0	92	60 - 140
1,3,5-Trimethylbenzene	4.9	5.0	98	60 - 140
1,4-Dichlorobenzene	4.7	5.0	94	60 - 140

P = Percent recovery measured.